

REMARKS

Claims 1, 2, 4, 5 and 9-14 are pending. By this Amendment, claims 2, 5, 13 and 14 are amended. The extraneous term "given" has been deleted in claims 2 and 5. These amendments do not narrow the scope of claims 2 and 5. Reconsideration of the January 6, 2003 Office Action is respectfully requested.

Claims 1-2, 4-5 and 9-14 stand rejected under 35 U.S.C. §112, second paragraph. The reasons for the rejection are stated at pages 2-3 of the Office Action. The rejection is respectfully traversed.

The Office Action asserts that it is unclear what constitutes the recited "halogenating agent" within the context of the claimed invention. Applicants respectfully disagree. Halogenating agents for practicing the invention are described at page 16, line 22 to page 20, line 23, of the specification. As explained at page 16, line 23 to page 17, line 2 of the specification, the halogenating agent can halogenate titanium alkoxide to form a titanium halide, and any of an inorganic halide, an organic halide and a halogen gas. In view of this disclosure, Applicants respectfully submit that one having ordinary skill in the art would understand the meaning of the term "halogenating agent" in the claims.

Regarding claim 2, the Office Action asserts that it is not clear whether the recited "a titanium halide"(first occurrence) is the same or different from the recited "a titanium halide" (second occurrence). The first-recited "a titanium halide" is contained in the waste solution treated by the claimed method. A part of this titanium halide is recovered by distillation. The second-recited "a titanium halide" is titanium halide that is produced by converting titanium alkoxide in distiller residue to titanium halide by contacting the residue

with a halogenating agent. Accordingly, the second-recited "a titanium halide" is different from the first recited "a titanium halide" in claim 2.

As suggested, the term "the distillation" has been changed to "the distilling" in claim 2.

Further regarding claim 2, the Office Action questions the meaning of the recitation "to recover a part of the titanium halide". By the feature of "distilling a waste solution" (first distillation) recited in claim 2, titanium halide contained in the waste solution is recovered. The waste solution includes not only titanium halide, but also other components, such as titanium alkoxide. By the first distillation, the waste solution is separated into a highly volatile part (low boiling point part) and a poorly volatile part (high boiling point part). The highly volatile part includes titanium halide, and is recovered from the distiller. The poorly volatile part includes titanium alkoxide, and remains in the distiller as residue. See page 22, line 11, to page 23, line 7, of the specification. In view of this disclosure, Applicants respectfully submit that one having ordinary skill in the art would understand the meaning of the recitation "to recover a part of the titanium halide" in claim 2.

Claims 13 and 14 have been amended to recite process steps, as suggested in the Office Action.

Accordingly, Applicants respectfully submit that claims 1, 2, 4, 5 and 9-14 are in compliance with 35 U.S.C. § 112, second paragraph. Therefore, withdrawal of the rejection is respectfully requested.

Claims 13 and 14 stand rejected under 35 U.S.C. § 101. The reasons for the rejection are stated at pages 3-4 of the Office Action. The rejection is respectfully traversed.

As mentioned above, claims 13 and 14 have been amended to recite process steps. Accordingly, Applicants respectfully submit that claims 13 and 14 are in compliance with 35 U.S.C. § 101. Therefore, withdrawal of the rejection is respectfully requested.

Claims 1, 2, 4, 5 and 9-14 stand rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,242,549 to Potter et al. (Potter) in view of U.S. Patent No. 4,472,521 to Band (Band). The reasons for the rejection are stated at pages 4-5 of the Office Action. The rejection is respectfully traversed.

Claim 1 recites "bringing a waste solution containing a titanium alkoxide into contact with a halogenating agent to convert the titanium alkoxide to a titanium halide and then distilling the solution containing the titanium halide to recover the titanium halide from the solution." Claim 2 recites "bringing a residue in a distiller after the distilling into contact with a halogenating agent to convert the titanium alkoxide to a titanium halide." Potter and Band fail to disclose or suggest the method recited in claims 1, 2, 4, 5 and 9-14 for the following reasons.

The Office Action admits that Potter fails to disclose or suggest converting titanium alkoxide to a titanium halide by contact with halogenating agent. However, the Office Action asserts that Band cures the deficiencies of Potter. Applicants respectfully disagree.

Potter discloses a process for the separation of titanium tetrachloride and halohydrocarbon from a mixture by distillation. The process separates a highly volatile

part (low boiling point part including a titanium halide) and a poorly volatile part (high boiling point part including titanium alkoxides). However, at column 3, lines 44-47, Potter discloses that "during vacuum distillation of titanium trichlorobutoxide, the titanium trichlorobutoxide undergoes apparent disproportionation to produce titanium dichlorodibutoxide and titanium tetrachloride." Accordingly, Potter discloses that conversion of titanium alkoxide (titanium trichlorobutoxide) to titanium halide (titanium tetrachloride) is achieved without using an agent, such as a halogenating agent. Thus, one having ordinary skill in the art would not have been motivated to modify Potter's process to use a halogenating agent to convert titanium alkoxide to titanium halide, because Potter discloses that such conversion already occurs without using a halogenating agent.

Furthermore, Band fails to cure the deficiencies of Potter. Band discloses a process for preparing a catalyst. The process uses a first compound, which is an alkoxide of a Group IIA or VIIB metal. Band discloses that especially preferred Group IIA and VIIB alkoxides are magnesium ethoxide, magnesium butoxide, manganese ethoxide and manganese butoxide (column 3, lines 7-18). However, Band does not disclose or suggest the conversion of titanium alkoxide to titanium halide. Rather, Band discloses the conversion of metal alkoxide to metal halide by using a halogenating agent, where the desired product is magnesium halide or manganese halide (column 4, lines 11-13). Band does not suggest modifying Potter's process to convert titanium alkoxide to titanium halide.

Also, Band discloses that one of the two preferred halogenating agents is titanium tetrachloride (TiCl_4) (column 4, line 22). Band provides no motivation to modify Potter's process to use titanium tetrachloride as a halogenating agent for converting titanium


alkoxide to a product of titanium halide (e.g., titanium tetrachloride) because the product of Potter's process is the same as the halogenating agent.

Accordingly, Potter and Band would not have rendered obvious the claimed invention. Therefore, withdrawal of the rejection is respectfully requested.

For the foregoing reasons, Applicants respectfully submit that the application is in condition for allowance and such action is earnestly solicited.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: 

Edward A. Brown
Registration No. 35,033

P.O. Box 1404
Alexandria, Virginia 22313-1404
703-836-6620

Date: March 28, 2003

Attachment to Amendment dated March 28, 2003

Mark-up of Abstract

[The] ~~A~~ method for recovering a titanium compound [according to the invention comprises] includes bringing a waste solution containing a titanium alkoxide into contact with a halogenating agent to convert at least a part of the titanium alkoxide to a titanium halide, and then distilling the solution containing the titanium halide to recover the titanium halide from the solution, or [comprises] the method includes distilling a waste solution containing a titanium alkoxide and a titanium halide to recover at least a part of the titanium halide from the waste solution, bringing a residue in a distiller [given] after the distillation into contact with a halogenating agent to convert at least a part of the titanium alkoxide to a titanium halide, and distilling the solution containing the titanium halide to recover the titanium halide from the solution. [According to the] The method [of the invention, a larger] can recover an increased amount of a titanium compound [can be recovered] from a waste solution containing a titanium alkoxide.

Attachment to Amendment dated March 28, 2003

Mark-up of Claims 2, 5, 13 and 14

2. (Amended) A method for recovering a titanium compound, comprising distilling a waste solution containing a titanium alkoxide and a titanium halide to recover a part of the titanium halide from the waste solution, bringing a residue in a distiller [given] after the [distillation] distilling into contact with a halogenating agent to convert the titanium alkoxide to a titanium halide, and then distilling the solution containing the titanium halide to recover the titanium halide from the solution.

5. (Amended) A process for preparing a titanium halide, comprising distilling a waste solution containing a titanium alkoxide and a titanium halide to recover a part of the titanium halide from the waste solution, and bringing a residue in a distiller [given] after the distilling [distillation] into contact with a halogenating agent to convert the titanium alkoxide to a titanium halide.

13. (Amended) A process for preparing a catalyst for polymer production, comprising:

[using the] recovering titanium halide [obtained by] according to the method of claim 1 [to prepare]; and
preparing a catalyst for polymer production with the titanium halide.

Attachment to Amendment dated March 28, 2003

14. (Amended) A process for preparing a catalyst for polymer production,
comprising:

[using the] recovering titanium halide [obtained by] according to the method
of claim 2 [to prepare];and
preparing a catalyst for polymer production with the titanium halide.